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SCIENCE NEWS LETTER

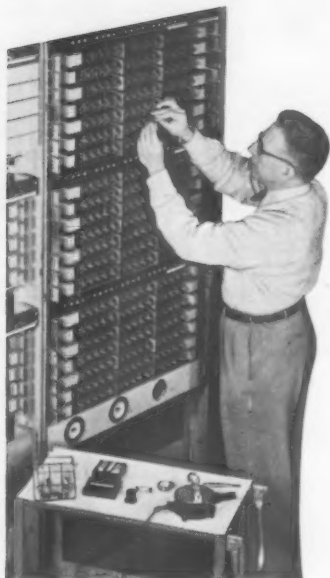
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Dragonflies

See Page 9

A SCIENCE SERVICE PUBLICATION



He's "fingerprinting" a relay contact

Bell Laboratories microchemists have perfected an ingenious new technique for "fingerprinting" relay contacts, the tiny switches on which a dial telephone system critically depends.

Using a portable test set, a chemist makes a plastic print of a contact. On-the-spot examination of the print with a microscope and chemical reagents quickly reveals the effects, if any, of arcing, friction, dust or corrosive vapors. While the chemist studies the print, urgently needed contacts continue in service. The findings point the way to improve relay performance.

This is another example of how Bell Telephone Laboratories research helps to keep your telephone system the world's best.



Above, Bell Laboratories microchemist applies plastic disc in heated clamp to relay contact. Imprint reveals contours of surface and picks up contaminants, if any. Part of portable test set is shown on table. Contacts, shown in small sketches, are of precious metal fused to base metal.



Preparing disc for microscopic examination. On-the-spot examination may reveal acid, alkali, sulfur, soot or other polluting agents peculiar to an area.



A microscopic look at disc often provides lead to nature of trouble. Unlike actual contact, print can be examined with transmitted light and high magnification.



Here the plastic disc has picked up microscopic lint that insulates contact, stops current. (Picture enlarged 200 times.) Traces of contaminants are identified in microgram quantities. Inert plastic resists test chemicals that would damage contact.

Bell Telephone Laboratories

*Improving telephone service for America provides careers
for creative men in scientific and technical fields*



AERONAUTICS

Pressurized Glider Urged

To study winds, chemical composition and other details of the stratosphere, sailplane carrying men and equipment up to 13 miles above earth's surface is proposed.

► A HUGE two-man glider with a pressurized cockpit may soon soar higher than 13 miles into the air to explore winds in the stratosphere.

The proposed craft, called a strato-sailplane, could ride the jet stream, a swift-moving current of air that circles the earth at about 30,000 feet, the American Meteorological Society was told.

Scientists could glide in the plane for as long as eight hours with 650 pounds of instruments for their high altitude tests. Until now, instruments in balloons, rockets and powered aircraft have provided most of the known data about the upper atmosphere.

The strato-sailplane would be the cheapest way to carry men to such altitudes, Victor M. Saudek, a director of the Southern California Soaring Association, Inc., told the meeting, held in Pasadena, Calif., in conjunction with the Pacific Division of the American Association for the Advancement of Science. It could also be ready for flight sooner than special power planes.

Glider without pressurized cockpits have reached altitudes of more than seven miles for a short time, by riding the Sierra Wave, a rising air current near the Sierra Nevada Mountains. They might have remained at that altitude, or climbed even higher, but the pilots could not endure the high altitude conditions for long.

The strato-sailplane will have interchangeable pressurized cockpits, designed for different missions. In case of emergency, the cockpit would fly free and drop by parachute until it was safe for the crew to bail out.

The plane will withstand violent turbulence, permit the crew to breathe easily at 70,000 feet, or more than 13 miles above sea level, and will be roomy and comfortable.

As a safety measure, the pilots will wear pressure suits, which will also supply warmth to protect them from the temperatures of 112 degrees below zero Fahrenheit found at such heights. The craft would fly at a top speed of about 100 miles an hour at 70,000 feet.

Two designs for the sailplane were proposed. The first has a 100-foot wingspan and would weigh 3,250 pounds. The second would have a wingspan of 120 feet and weight of 3,700 pounds. The DC-7, a four-engined commercial airliner, has a wingspan of 117 feet.

To reach 70,000 feet, the glider will be towed by a powered plane into the rising Sierra Wave. The sailplane will then drop the towline and soar above the tow plane, climbing at a rate of about 2,000 feet a minute. The climbing rate drops at higher

altitudes. With favorable currents, the plane should reach 70,000 feet in two to four hours.

The descent would take about an hour and no problems are foreseen in landing safely. At 10,000 feet, such a strato-sailplane could choose any landing place in an area of 60,000 square miles.

The proposal for the plane was based on research by the Southern California Soaring Association for the University of California and the Geophysics Research Division of the Air Force Cambridge Research Center.

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RADIO ASTRONOMY

Twinkling of Stellar Radio Waves Studied

► TWINKLING OF invisible "stars" in the sky detected by changes in the radio waves they emit is being studied by scientists at the University of Alaska.

There are "marked differences" between the way radio "stars" twinkle in England and in Alaska, Dr. C. Gordon Little found in his preliminary studies, the first known to have been made so near the Arctic circle.

These differences and the twinkling itself give clues to the size, shape and movements of the dense regions in the ionosphere that cause them.

Scintillations are more common in Alaska than in England and do not show the same daily variations, Dr. Little's study showed.

The stellar radio waves have many advantages over man-made transmitters for ionospheric studies, including no cost, investigation of a wide area of the ionosphere from a single station and the possibility of obtaining information about very high regions of the ionosphere.

Science News Letter, July 2, 1955

NUTRITION

Opaque Paper Best to Keep Vitamin in Bread

► THE HOUSEWIFE may like to buy bread wrapped in transparent cellophane so she can see the loaf but enriched white bread keeps more of the important B vitamin, riboflavin, when wrapped in opaque waxed paper.

Commercially baked, enriched white bread wrapped in opaque waxed paper kept 70% to 85% of its original riboflavin content when exposed to light 12 hours a day for five days. The same commercially baked bread wrapped in cellophane kept 45% to 65% of its original riboflavin under the same light exposure.

Light breaks down the riboflavin, W. H. Kanninen, director of food technology for Foster D. Snell, Inc., New York, reported to the Institute of Food Technologists meeting in Columbus, Ohio.

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CARRIER-BASED FIGHTER—The Navy's supersonic jet fighter, XF8U-1, designed to operate from carriers, is now being tested. It can swiftly climb to more than ten miles, and is believed to fly about 900 miles an hour. Chance Vought test pilot John Konrad is flying the plane out of Edwards Air Force Base, Calif.

MEDICINE

Artificial Kidney Used

► THE ARTIFICIAL kidney can save minds as well as lives. It can do this when the mind has been deranged by a poison, thiocyanate.

This new role for the artificial kidney was discovered by Capt. Lamont E. Danzig, Army medical officer at Brooke Army Medical Center, Fort Sam Houston, Tex., and Dr. Alan J. Kringel of the Veterans Administration Hospital, Palo Alto, Calif. They report it in the *Journal of the American Medical Association* (June 18).

The discovery was made in the case of a 57-year-old woman, wife of an Army sergeant. She had been getting potassium thiocyanate to reduce her high blood pressure, which it did. Both potassium and sodium thiocyanate have been used to reduce blood pressure for almost half a century, although these chemicals must be used very carefully to avoid mental derangement and even fatal poisoning.

About six weeks after starting this treatment, the Army sergeant's wife began behaving oddly and neglecting her personal appearance. She wrote confused and illegible letters to her husband.

She was taken to the hospital where she became assaultive, wanted to kill herself and had delusions of persecution. Her mental state was so bad she had to be put in a locked ward of the neuropsychiatric department. She continued to remain in this state for a week.

Then she was treated with the artificial kidney for six hours. About 22 hours later, she began to improve noticeably. She was so much better and her appearance had changed so within 36 hours that the doctor caring for her had trouble recognizing her. At the end of a month, she had completely recovered and was discharged from the hospital.

The artificial kidney removed the thiocyanate from her body fast and in large amounts. Her own kidneys had not been able to do this. The doctors think the artificial kidney may have saved the patient's life, as well as restoring her sanity.

When an artificial kidney is used, the patient's blood runs through membranes of cellophane or similar dialyzing material and back into the patient's body. The thiocyanate molecules, and other poisonous ones in other cases, are small enough to pass through the small pores of the artificial kidney membranes. They are thus removed from the blood.

In the case of the Army sergeant's wife, the artificial kidney reduced the thiocyanate in the blood serum from a level of 24.8 mg per 100 cc to 1.5 mg per 100 cc.

In further studies, the doctors found that the artificial kidney is 73.6 times more efficient in removing thiocyanate than normal kidneys. They suggest using it in future cases of thiocyanate poisoning.

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NEUROLOGY

Drugs Affect Artists

► THE OLD idea that drugs can inspire artists to better creative work gets some confirmation from studies reported at the American Neurological Association meeting in Chicago.

The studies also confirm another idea long held by scientists. This is that nothing much comes of the inspiration because the drugs stop initiative so that the artists fail to get started working on the new ideas.

The studies were made by giving four painters of national prominence two drugs, mescaline and LSD. Mescaline is extracted from the Mexican plant better known as peyote. It induces an intoxication with delusions of color and music. LSD, short for lysergic acid diethylamide, is a chemical that produces hallucinations and delusions in healthy persons like those in mental sickness.

Under the influence of these drugs, the painters reported seeing wonderful pictures in their minds. But only one of them took to painting "with great fervor." The others did not want to paint. They were content just to enjoy the visions they saw.

When finally induced to paint, their greater freedom of expression of form and

color led to work that their peers judged better than work they had produced before taking the drugs.

Writers apparently are not affected in the same way by the drugs. One, a playwright, was tested. He also had his senses heightened by LSD but when he tried to write, he did not come up to his usual level of literary creativeness.

The scientists reporting these studies were Drs. Louis Berlin, Thomas Guthrie, Arthur Weider and Harold G. Wolff of New York.

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MICROBIOLOGY

Million Molecules in Single Bacterium

► HOW MANY molecules in a single bacterium? Something like 1,000,000, with the tiny organism capable of manufacturing them at the rate of 21,000 per minute.

These computations were made by the late Dr. O. L. Sponsler and Dr. Jean Bath of the University of California at Los Angeles.

The bacterium studied was the *Escherichia*

coli, a common organism found in human intestines. Using known figures of volume, weight and protein percentages, the scientists computed the total number of protein molecules in the organism to be 1,070,000.

"This is, of course, not to be regarded as a precise figure," Dr. Bath said. "It is simply an indication of order of magnitude."

The time between generations of bacteria is about 25 minutes, the U.C.L.A. scientists pointed out. If it is assumed that the bacterium manufactures its individual protein molecules at a uniform rate, this would amount to 21,400 molecules per minute.

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TECHNOLOGY

First Ocean Phone Cable

Ship begins laying lines for telephone cable to carry 36 simultaneous calls between North America and Europe. First conversations are expected to be made late in 1956.

► LAYING OF the world's first trans-oceanic telephone cable, linking North America and Europe, was started when the *Monarch*, the largest cable-laying ship, began rolling out the line on June 22 at Clarenville, Newfoundland.

The 2,372-mile underwater cable will cover the 2,250 miles between that point and Oban, Scotland. The extra length is needed because the cable will follow the ocean's uneven floor, which sometimes rises in mountains and which, at other points, is more than three miles below the surface.

Transatlantic telephone calls today are transmitted by bouncing radio signals off the ionosphere. Such beams carry about four simultaneous conversations, but the system is hampered by interference. The new cable will handle 36 calls at a time and, except for rare accidents, will be thoroughly dependable.

Deep under the water, the cable is safe not only from storms and fire but from farmers, who have plowed up land cables. It faces new enemies, however.

Whales, for instance, have been known to get tangled in such lines and damage them. Icebergs hit the lines and smash them, fishermen haul them up and either break them or cut them, ship anchors sometimes tear them.

To prevent storm and fisherman damage, portions of the cable near the shore are about two and a half inches in diameter, while the deep water cable is only about an inch in diameter. Wrappings of copper tape protect the cables from the teredo worm, a marine borer. Outside are wrappings of anti-corrosion tape, jute, armor wires, then two more coatings of jute cushioning.

The core of the cable is a copper wire, wound with more copper and coated with plastic.

Telephone engineers believe that in calm, deep waters the cable will be safe from damage, except possibly from earthquakes.

If there is a break or failure, electronic gear will locate the trouble point within a half or quarter of a mile. Ships then will go out and grapple for the line, bring it up and make the repairs.

Use of underwater cables to carry the human voice has been made possible by development of a rugged amplifier called a "repeater" to be placed at 40-mile intervals. Developed by Bell Telephone Laboratories, the device is 2.8 inches in diameter, eight feet long and is built in as part of the cable. The repeater is designed to hold up under pressures of 6,000 pounds per square inch and to last for 20 years or more.

The new repeaters take over a year to manufacture and cost \$70,000 each. They

are made by Western Electric at Hillside, N. J. Atmosphere in the plant is kept 100 times cleaner than rural air and the workers are dressed in white, lint-free uniforms.

After laying the cable to Scotland, which will take about four months, the ship will return next summer to lay the east-to-west line. The first conversation over the cables is expected to be made late next year.

The system will be linked to the United States through a single cable between Clarenville and Sidney Mines, Nova Scotia, and a radio relay from there to Portland, Maine. The entire network is expected to cost about \$40,000,000.

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AGRICULTURE

Lack of Fertilizers Cuts USSR Agriculture

► RUSSIAN FOOD production is kept low by lack of fertilizers, while fertilizer production is being held back by emphasis on heavy industry, according to Dr. Mirko Lamer, Russian expert for the Council for Economic and Industry Research in Washington.

Fertilizers are so scarce in the USSR that they are something of a luxury item, but in order to boost stocks of fertilizers, Russia would have to alter its economic goals and move emphasis away from war production, Dr. Lamer pointed out in the *Journal of Agricultural and Food Chemistry*.

On paper, the Soviets seem ready to attack this shortage. According to plan, fertilizer production should hit 16,500,000 to 17,500,000 metric tons in 1959 and 28,000,000 to 30,000,000 by 1964.

Actual production figures make these plans unrealistic. Production only increased from 4,900,000 in 1950 to 7,200,000 tons in 1954, while no new plants were constructed that could raise the output suddenly to 17,000,000 tons in five years, Dr. Lamer said.

A change to large-scale fertilizer production would call for the establishment of many new plants throughout Russia, but it is doubtful that such a switch is possible in the present period of industrial mobilization in the development of heavy industry, he said.

A peace economy would make this kind of change a lot easier to accomplish.

While Russia is having trouble growing enough food for itself now, Dr. Lamer said that crop yields in the USSR can be significantly increased by the use of fertilizers, lime and gypsum, all of which could be produced on a large scale in the country.

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DRAWING A THREAD—Much as a housewife tests candy, Frank A. Sattler, supervising chemist at the Westinghouse Research Laboratories in Pittsburgh, checks the laboratory preparation of a new silicone-modified insulating enamel for copper wire. It can withstand temperatures of 325 degrees Fahrenheit.

TECHNOLOGY

New Wire Coating Will Permit Smaller Motors

► A SILICONE-MODIFIED enamel for electrical wires, which can stand higher temperatures for longer periods of time than any non-silicone enamel, has been developed by scientists in Pittsburgh.

The insulator is expected to permit development of smaller electric motors with greater power.

Tests at the Westinghouse Research Laboratories showed that a motor having wires coated with the new polyester-type enamel can operate continuously for 10 years at a temperature of 325 degrees Fahrenheit without damage to the insulation. This is equivalent to normal operation of a refrigerator motor for 30 years or a washing machine for about a century.

Science News Letter, July 2, 1955

BIOCHEMISTRY

Anti-TB Drug May Be Good Weed Killer

► ISONIAZID, NOW widely used as a remedy for tuberculosis, may join the ranks of weed killers that can be put into the soil to stop the plants before they have grown above the earth.

Studies showing this are reported by Dr. A. G. Norman of the University of Michigan in the journal, *Science* (June 10).

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ENTOMOLOGY

Insects Are Building Up

► **BOLL WEEVILS** are building up their numbers in the maturing cotton fields of the Southland, while grasshopper populations are becoming heavier in several states west of the Mississippi, the U. S. Department of Agriculture has revealed.

Boll weevils are increasing rapidly in the lower Rio Grande valley and are migrating. They were found at rates of 66 per acre on untreated fields and 21 per acre on treated fields. Throughout the weevil areas of Texas, they are present in much larger numbers than last year, the report said.

In southwest Arkansas, some fields have up to 1,500 weevils per acre. Of 22 fields checked in Alabama, 19 showed weevil infestation. The delta counties of Mississippi showed an average of 65 weevils per acre compared with 52 the previous week.

Grasshoppers are becoming a problem now in southwest and central Missouri, doing damage to alfalfa. Grasshopper counts on the margins of fields range from 20 up to 300 and 400 per square yard.

Heavy, widespread infestation by grasshoppers is reported from several counties in Texas and New Mexico. To combat out-

breaks, 176,000 acres of rangeland are being sprayed in two New Mexico counties. Nearly all fields in northeast Kansas show adult grasshoppers, and some damage is reported to alfalfa.

Thirty-inch corn in Illinois has 200 egg masses of the European corn borer per 100 plants. Cool weather has kept this corn borer back in Iowa, but 10% of the corn crop in the central and northern areas of the state may have heavy damage if weather favors egg-laying and hatching.

The alfalfa weevil has been reported for the first time from the state of Washington. In New Jersey, this weevil has defoliated many unsprayed fields and damaged some treated fields in the southern area.

Living specimens of a fig wax scale were intercepted on fig cuttings sent in the mail from Italy. This insect is injurious to figs in parts of Europe, Asia, Australia and South America.

This fig wax scale secretes a "honey dew," which furnishes food for a sooty mold that develops on the figs, making them unsuitable for drying.

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PSYCHOLOGY

Self Judgment Poor

► **A MAN** is a remarkably poor judge of himself, Dr. Wilse B. Webb, psychologist of the U. S. Naval School of Aviation Medicine, Pensacola, Fla., has found.

And any one of his companions is likely to be as far off in judging the man as he is himself.

When his friends pool their judgments of him, however, they can classify him fairly well, and the larger the number taking part in the group judgment, the more accurate it will be.

Dr. Webb drew these conclusions after comparing the self-ratings of Naval Aviation Cadets with ratings of them by others in the group and with the results of objective tests.

Although ratings were made on several traits, including leadership, social adequacy, intelligence, possibility of success in flight training and possibility of success as a Naval aviator, comparisons were made only for intelligence because for this trait objective scientific tests were available.

The group ratings for the men agreed fairly well with the test scores. The self-ratings were way off. And the judgment of any one cadet on any other was likely to be just as bad as the man's judgment of himself.

Each man really has three selves, Dr. Webb concluded. There is his "objective self," the real him as shown by scientific tests. Then there is his social self, or the summation of the group's attitude toward

him. And, finally, there is his "self concept," or his own assessment of his abilities.

Perhaps a man's opinion of himself might be closer to reality, Dr. Webb suggested, if he rated himself on the same traits several times over a period of time and the average rating was determined.

It is quite possible, too, he stated, that a man's true self might change over time to become more like his associate's opinion of him.

Results of Dr. Webb's study are reported in the *Journal of Consulting Psychology* (June).

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ZOOLOGY

Bat Makes Own Belfry For Daytime Sleep

► **A BAT** that builds its own belfry inhabits Barro Colorado Island in the Canal Zone, the Smithsonian Institution reported.

Known as *Uroderma*, the nocturnal creature is a tent-maker. For its home, it cuts and bends a palm or coconut leaf into a tent shape, then spends the day inside.

Several bats often share the same home-made apartment at the Institution's jungle wildlife preserve and biological experiment station. When it gets too hot and uncomfortable inside the tent, it is reputed, the bats turn on the air-conditioning. That is, the bats fan one another with their wings.

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• RADIO

Saturday, July 9, 1955, 5:00-5:15 p.m. EDT
"Adventures in Science" with Watson Davis, director of Science Service, over CBS Radio Network. Check your local CBS station.

Francis W. Davis, consulting engineer of Waltham, Mass., and inventor of power steering for motor vehicles, will discuss "Hydraulic Power Steering."

PHYSICS

Highest Energies Reached in Accelerator

► **THE HIGHEST** man-made energies ever reached are given atomic particles in the University of California's bevatron, the world's most powerful atom smasher at Berkeley, Dr. Walter H. Barkas has reported.

The physicist said that nearly all of the strange nuclear fragments found in cosmic rays are generated by the machine, which has accelerated protons to 6.2 billion electron volts. The protons, hearts of hydrogen atoms, are used to probe the complex structure of atomic cores.

Dr. Barkas, a physicist at the University's Radiation Laboratory, told the Pacific Division of the American Association for the Advancement of Science meeting in Pasadena, Calif., that research so far has been of a survey type.

Now-puzzling questions concerning the short lifetimes and other basic facts about the so-called K particles may be removed by studying the high concentration of them produced in the bevatron under controlled conditions, Dr. Barkas said.

The bevatron cost \$9,000,000. Particles travel 300,000 miles in being whirled up to their energies. It has the world's largest magnet, 135 feet in outside diameter, weighing 10,000 tons.

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MEDICINE

Aspirin Stops Return Of Kidney Stones

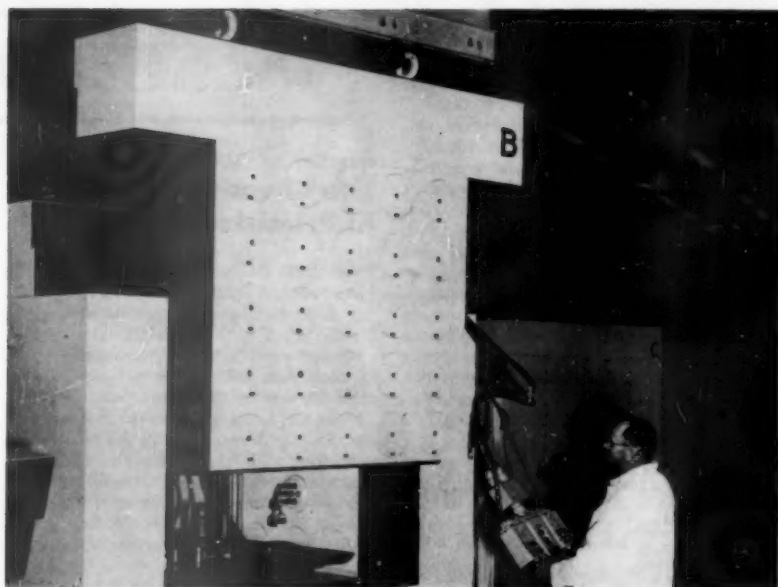
► **DAILY DOSES** of aspirin has stopped kidney stones from forming again in patients who had had frequent repeat attacks of kidney stones, Drs. Edwin L. Prien of Brookline, Mass., and Burnham S. Walker of Boston reported at the meeting of the American Medical Association in Atlantic City, N. J.

The daily aspirin also stopped the growth of existing stones.

These results were obtained in 17 of 19 patients who have been taking the aspirin for more than a year.

The aspirin apparently acts by combining, or conjugating, with glucuronic acid. A crude extract of human kidney excretion which contains glucuronic acid in conjugated form has been found to check the precipitation of calcium salts. Kidney stones containing calcium were the kind stopped by the daily aspirin.

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ATOMIC "IRON CURTAIN"—This 15-inch-thick metal barrier is part of a cell built at the Hanford plutonium plant, Richland, Wash., by General Electric scientists to prevent escape of radiation during examination of samples of radioactive metals.

NUTRITION

Cheap Diet Outlined

► FOR ABOUT 60 cents a day you can be adequately nourished if you eat the following: a loaf of bread, one-quarter of a pound of butter or margarine, one quart of vitamin D milk and six ounces of orange juice.

This diet was presented by Dr. Robert S. Harris of Massachusetts Institute of Technology, Cambridge, Mass., at the meeting of the National Association of Margarine Manufacturers in White Sulphur Springs, W. Va.

In hot weather, Dr. Harris said, you need not stop eating fats. Contrary to popular opinion, experiments cited by Dr. Harris show that a person is hotter, not cooler, on a diet high in sugars and starches. Fats, he declared, counteract this.

Dr. Harris does not suggest that, "good as it is," anyone try to live on the bread, spread, milk and citrus diet.

"For psychological and physiological reasons it is desirable to eat a variety of foods," he said. "I wish only to demonstrate that an excellent inexpensive diet in these United States can be based on bread and spread, milk and citrus. This is the basic diet, from which departures may be made."

For the future, Dr. Harris predicted a new spread, acetin margarine, which will not go rancid, will spread easily when cold and will not become fluid when warm. Yellow color for margarine and other foods, he thinks, should come from a natural pigment, preferably beta carotene

which adds vitamin A activity. All synthetic yellow dyes, he said, are now suspect and might in the future be banned as too dangerous to health.

Debunking some popular fallacies about fats, including the one about it being a poor hot-weather food, Dr. Harris gave the following facts:

1. Fats are easily and completely digested.
2. On a caloric basis, fats are no more fattening than carbohydrates or proteins.
3. There is no proof that fats cause atherosclerosis (artery disease), though they may later be found to be secondary factors.
4. Hydrogenated fats are nutritionally equal to other food fats.
5. Margarine is nutritionally equal to butter.

The American public is now oversold on the virtues of vegetables, stone-ground flour, whole wheat, rye and pumpernickel breads, Dr. Harris thinks.

During the "roller mill era" between 1880 and 1941, our white flour and bread had become "emaciated," and people who depended largely on bread and flour for food were badly nourished. In 1941 when we entered the "enriched bread era," the urgent need for green and yellow vegetables disappeared from the diet. Our enriched white bread is better than standard dark breads today.

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GENERAL SCIENCE

AAAS Confirms Atlanta For December Meeting

► ALTHOUGH URGED by several individuals and organizations not to meet in Atlanta, Ga., because of the policy of segregation there, the American Association for the Advancement of Science has decided to go ahead with plans for Christmas week meetings in that southern city. (See SNL, May 21, p. 328.)

Decision was made at a special meeting of the board of directors in Washington.

In order to advance science and its public understanding, it is desirable for the AAAS to hold meetings in every part of the country, the directors decided.

Because the Association recognizes no distinction on the grounds of color, the situation in Atlanta was given careful consideration. The directors assured themselves that all scientific sessions, the exhibits, the Science Theater, and such special social functions as the presidential reception and the biologists' smoker could be held on a non-segregated basis.

Segregation of Negroes would, however, be enforced in hotel living accommodations, restaurants and transportation facilities.

The board of directors decided to go ahead with plans for the meeting in Atlanta because they believe that meeting there "will serve to improve the effectiveness of science in the promotion of human welfare," according to a formal statement issued by them.

They believe, the statement said, that "scientists of all races will benefit from participation in this meeting, and that the advantages outweigh the disadvantages." The full text was reported in *Science* (June 24).

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AGRICULTURE

Southeast U. S. to Get Superior Lawn Grass

► A HARDIER, darker green lawn grass that has a fast rate of spread has been released to nurserymen.

Named Emerald Zoysia, the new wide-cross hybrid is described as superior to either of its Far-Eastern parents, *Zoysia japonica* and *Zoysia tenuifolia*. Developed by Ian Forbes of the U. S. Department of Agriculture's plant industry station in Beltsville, Md., the hybrid is well adapted for the southeastern United States. Agronomists also believe that it may fare well in some areas farther north.

Emerald Zoysia is winter hardy, has fine leaves and produces a dense turf. An added attraction is the ability of the grass to produce leaves on short stems that do not "brown off" when the grass is closely clipped.

Plugs and sprigs of the hybrid will be generally available by the spring of 1957.

Science News Letter, July 2, 1955

BIOCHEMISTRY

Slow Thyroid Can Slow Child's Reading Ability

► CHILDREN WHO have trouble learning to read and are generally slow learners, getting along poorly in school, should have tests to see whether their thyroid glands are functioning properly.

This advice was given by Dr. Charles Posner of the Endocrine Clinic, Pasadena (Calif.) Dispensary, at the meeting of the American Association for the Advancement of Science's Pacific Division in Pasadena.

Scientists have long known that when the thyroid gland in the neck does not put out enough of its hormone, the mind is retarded and behavior affected.

Reading disability, Dr. Posner found, was a common complaint among 35 children studied over the past 10 years because they had thyroid glands that were under functioning.

Even with special tutoring, these children made very slow progress. They had a very short attention span, were easily distracted and were poor at getting the meanings of words and ideas. Being slow learners, they could not compete with their classmates and developed feelings of inferiority, frustration and resentment. Behavior problems developed.

When given thyroid extract to make up for the failure of their own glands to produce enough, they showed great improvement in understanding, remembering and reading.

Some gained one and one-half years in reading ability in one semester without any change in teaching methods, Mrs. E. M. Wittker, clinical psychologist in the Pasadena City Schools, found.

Many of these children who had been failing in all their subjects throughout their school life did very acceptable work within a relatively short time after starting the thyroid doses.

Science News Letter, July 2, 1955

TECHNOLOGY

Suction Principle May Revive Windmill

► THE WINDMILL may be staging a comeback as a source of power in its new form, the centrifugal suction mill. It promises to produce electrical energy at about two-thirds the cost of steam generation.

A 100-foot experimental prototype has been built at St. Albans, England, and success in preliminary trials was reported by the Enfield Cables Limited, London.

As the propeller turns in the wind, centrifugal force drives air out of ports at the extremities of the two hollow blades. This sucks air through the windmill body, driving an air turbine near ground level.

By replacing the conventional mechanical linkage with the cushion of the column of air, flexibility is obtained without clutches or gears.

The windmill is designed to turn 100

times a minute in winds of all speeds between 30 and 65 miles per hour. When winds are stronger than 30 m.p.h. the blade pitch automatically adjusts to keep rotation speed constant.

With winds of between 30 and 65 m.p.h., output in the mill is held at a rated 100 kilowatts. The blades are feathered and rotation ceases when winds become faster than 65 m.p.h. The blades are also free to come 18 degrees down wind and eight degrees up wind to relieve stresses due to gust conditions.

Owing to the advance in atomic energy, British Government interest in the use of wind power for electricity production in the United Kingdom is less than it was five years ago when the project was inaugurated. Meanwhile, however, global interest, particularly in under-developed regions, is growing.

The final location of this plant has not yet been decided, plans to install it in North Wales having been dropped owing to local objections.

Science News Letter, July 2, 1955

INVENTION

Balloon-Helicopter Pedaled Like Bicycle

► PEDALING AROUND the sky and stopping off in the "wild blue yonder" where you want to, to look at the earth below, may be possible with a combination balloon-helicopter invented by Charles K. Paul of Woodbridge, N. J.

Designed for rescue and observation work, the aircraft combines the slow movement and safety advantages of both types of airborne equipment. It might also prove useful to the commuter, sports fan and Sunday sight-seer.

To operate the craft, the pilot sits on the seat and pedals with his feet which, in turn, causes the helicopter blades mounted below the pilot to rotate. Once airborne, the pilot can literally stop along the way by rotating the balloon mounted above in the opposite direction of the propeller blades. This causes the craft to stand still.

The "flying machine" powered by human energy received patent No. 2,704,192.

Science News Letter, July 2, 1955

OPHTHALMOLOGY

Transplant Tendon To Uncross Eyes

► CHILDREN WITH the kind of cross eye condition, or squint, in which one eye does not focus with the other can be helped by an operation in which a tendon is transplanted. The condition is known medically as "paralytic squint."

The new tendon pulls the off-focus eye back into focus. The operation was reported in detail by Dr. I. Lloyd Johnstone of Worcestershire, England, at the joint meeting of the British, Canadian and Ontario Medical Associations in Toronto.

Science News Letter, July 2, 1955

IN SCIENCE

CHEMISTRY

Life Chemicals Found In Primitive Atmosphere

► AMINO ACIDS, the basic stuff of life, have been produced spontaneously by sending electric charges through an atmosphere resembling the air of the primitive earth.

If this experiment is a reasonable model of conditions found on a new-born planet, then an easy explanation of the formation of organic compounds on earth is at hand, Dr. Stanley Miller, organic chemist of Los Angeles, told the Botanical Society of America meeting with the American Association for the Advancement of Science's Pacific Division in Pasadena, Calif.

Following evidence that the young earth had an atmosphere mostly of methane, ammonia, water and hydrogen instead of the present one of carbon dioxide, nitrogen, oxygen and water, Dr. Miller set up a mixture of gases corresponding to this primitive atmosphere and subjected it to electric discharges for about a week.

Dr. Miller identified the amino acids glycine, alanine, beta-alanine and five others from the mixture. He also recovered glycolic, lactic, formic, acetic and propionic acids.

Aldehydes and hydrogen cyanide are formed in the electric discharge, Dr. Miller said. These compounds react with the water portion of the atmosphere to form amino and hydroxy nitriles, which are then hydrolyzed to the amino and hydroxy acids.

It would seem that a great many of these compounds formed would be those that are components of present living organisms, he said.

Science News Letter, July 2, 1955

STATISTICS

Fewer Wedding Bells For Next Five Years

► THE NUMBER of marriages each year in the United States has fallen off from its high of 2,291,000 in 1946 to a mere 1,484,000 in 1954. It is likely to continue at a low level until 1960, statisticians of the Metropolitan Life Insurance Company in New York have reported.

They give two reasons for the decline in marriages: 1. The unusually large number of marriages during and immediately after World War II, which reduced the ranks of those eligible to marry. 2. Decreased births during the 1930's, which thinned the population at ages where marriage rates are highest.

Marriages are dissolved by divorce or death at the rate of about 27 per 1,000 existing marriages.

Science News Letter, July 2, 1955

CE FIELDS

MEDICINE

Remove Pituitary to Aid Young Diabetics

► OPERATIONS IN which the pituitary gland in the head is removed have now been performed on six children with very severe diabetes. Drs. Laurance W. Kinsell, Lester Lawrence and Robert D. Weyand of the Samuel Merritt Hospital and the Highland-Alameda County Hospital, Oakland, Calif., have reported.

The young patients all had major eye and kidney diseases.

After the operation, all of the children could get along on much less insulin even when eating a relatively large amount of sweets and starches. The average insulin requirement was less than 15 units instead of over 60 units as it had been before the operation.

High blood pressure, that some of the children had, disappeared after the operation. Kidney function improved somewhat and red blood cell production improved in two of the patients.

All patients needed regular doses of insulin, thyroid extract, cortisone and male or female hormone, according to sex, the doctors reported at the joint meeting of the American Diabetes Association and the Endocrine Society in Atlantic City, N. J.

Science News Letter, July 2, 1955

PSYCHOLOGY

Every Large Family Has Its "Responsible One"

► PRACTICALLY EVERY large family has one child who is the "responsible one." Another among the children is usually outstanding as likable or popular. Then there is the "studious one," the "social butterfly," the "lone wolf," the irresponsible one, the "sickly one," and the spoiled "baby."

These eight different personality types were found to be commonly represented in large families. The types were brought to light by a study of 100 large families with a total of 879 living children.

The research was conducted under the auspices of the William T. Carter Foundation at the University of Pennsylvania.

Most of the families were brought up in small-town, village, or farm communities, but 24 had their homes in either New York, Philadelphia or Brooklyn.

The eight personality types were not found in every family studied. Some families do not have eight living children. Others may have two or more children of the same type.

Nearly every family has at least one child who is of the responsible type, however. This is usually the oldest son or the oldest

daughter. This child may early take on the duties of wage-earner for the family or the maternal care of the younger children.

The popular, attractive child is most often the second child in the family or the one next younger than the responsible one. It is as though these children, finding the "little mother" or "family head" role already filled, seek recognition through their charms, by making themselves agreeable. The next children turn from the family to the community—they become social-minded and ambitious. Then come those who seek attention through their school achievement, sickness or dependence.

At least, this is the explanation offered by Drs. James H. S. Bossard and Eleanor Stoker Boll, in reporting the study to *Child Development* (March).

Science News Letter, July 2, 1955

ENTOMOLOGY

Imported Flies Used To Fight Cane Borers

► INSECTS ARE being used effectively as insecticides by southern farmers to help fight the destructive sugarcane borer.

Two species of parasitic flies, imported from Latin America, have shown promise in controlling the cane pest, the U. S. Department of Agriculture has reported. The parasitic flies, *Metagonistylum minense*, originally from the Amazon, and *Lixophaga diatraeae* from Cuba, instinctively deposit their eggs near the holes the cane borers made to enter the sugarcane stalks. Almost immediately, the eggs hatch and the young maggots enter the holes and devour the borers.

A year after the two species were released on one plantation, the Government entomologists reported, control of the borers was found to be 75% effective. They expect the parasites will give only partial control because the flies will be affected by abundance of borers and weather.

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ENTOMOLOGY

Larval Dragonflies Kill Small Fish

See Front Cover

► GAUDY, FAST on the wing and deadly to its prey, the dragonfly commands high respect in the insect world. It is highly predacious, and even in the aquatic nymph stage it is capable of killing small fish.

The dragonfly couple, shown on the cover of this week's SCIENCE NEWS LETTER, are in a rare moment of repose. Dragonflies are sturdy fliers, hunting and capturing their prey on the wing, and many of them lay their eggs while flying.

The eggs are laid in water. After about two weeks incubation, they hatch into nymphs and remain aquatic creatures until the adults emerge after metamorphosis.

Science News Letter, July 2, 1955

ENGINEERING

Auto Engine Deposits Force Octane Increase

► THE REASON auto engines need high octane fuel is the minute amount of deposit that forms in the combustion chamber during engine operation.

Insulating and thermal effects of the deposits cause a 40% to 60% increase in the octane requirement, two Du Pont engineers reported to the Fourth World Petroleum Congress in Rome.

Both fuel and oil are responsible for the deposits, and consequently for engine knock, they found. Change in the composition of newer oils can reduce the required octane rating from four to six numbers. At the same time, preignition is cut.

From 10% to 40% of this increase is the result of the deposit's physical volume, which adds to the compression ratio. A change of timing or location of ignition, brought about by surface ignition or preignition, also increases the engine's requirements for antiknock gasoline.

Reducing the high boiling fraction of fuel could lower preignition tendencies and octane requirements, J. J. Mikita and B. M. Sturgis of the company's petroleum laboratory found.

Science News Letter, July 2, 1955

PUBLIC SAFETY

Energy Pad on Auto Would Add Safety

► ADDING AN energy-absorbing pad to the front end of automobiles and strapping drivers and passengers down with safety belts may save thousands of lives, Prof. Elmer F. Bruhn of the Purdue University School of Aeronautical Engineering, Lafayette, Ind., has suggested.

Prof. Bruhn, an authority on airplane structure, is exploring what happens when cars crash. High-speed movies of crashes with model cars and dummy passengers reveal that being thrown forward when the car stops suddenly accounts for most crash injuries and deaths.

An energy-absorbing device on the front end of automobiles to control crash deceleration, and restraining belts to keep drivers and passengers from flying into the car structure would provide a sufficient margin of safety when crashes do occur, Prof. Bruhn believes.

Purdue's fleet of automobiles, used by staff members on university business, may soon sprout such safety devices, to test driver reaction to them and, in case of any crashes, to check their effectiveness in decreasing injury.

Prof. Bruhn also hopes to be able to stage real crashes with late model cars and volunteer drivers, in order to demonstrate conclusively that the safety devices he recommends will work effectively in cars, as they do in airplanes, which have much higher crash velocities.

Science News Letter, July 2, 1955

HORTICULTURE

No Excuse For Weeds

The annual weed battle is on. Promising new chemicals, being developed every day to help the farmer, gardener and homeowner, mean a new vocabulary for the public.

By HOWARD SIMONS

► MORE THAN three centuries ago, a gardener in one of Shakespeare's plays decided:

"I will go root away
The noisome weeds which without
profit suck
The soil's fertility from wholesome
flowers."

Today's gardener, whether he is a farmer or a homeowner, still faces the problem of getting rid of weeds. But the backaches undoubtedly suffered by Shakespeare's gardener in Richard II have given way to chemical compounds, spray guns, garden hose attachments and pellets.

Weeds are still a major agricultural problem and a nuisance. Hundreds of millions of dollars are lost to the "noisome weeds" each year and inestimable riches are robbed by weeds in home gardens, lawns and along the nation's highways.

Weedless World Foreseen

Weeds can be controlled. A combination of good gardening practices and the proper use of chemicals can eliminate weeds. Scientists are developing weed-killing chemicals and techniques at a rapid rate and the day is not too far distant when we may have a weedless world.

Weed-killing compounds, known as herbicides, are cropping up almost as fast as their intended enemies, the weeds. They are proving to be effective. They are also presenting the home gardener and the farmer with a new alphabetical vocabulary to master, with such abbreviated nicknames as NIX, SES, 2,4-D, AMMATE, 2,4,5-T, CMU and PCP.

Proper Gardening Required

The use of these chemicals to get rid of weeds from gardens and farms is not the whole story, however. Proper gardening is also a must. Agriculturists point out that healthy plants and lawns are as much weed controllers as are man-made weapons.

To keep a lawn or turf area free from weeds, U. S. Department of Agriculture specialists at the plant industry station, Beltsville, Md., recommend that gardeners adequately fertilize their lawns and gardens; plant turf grasses that are best suited to the particular soil; mow most grasses to a height of one and one-half to two inches; use proper watering practices, and control insects and plant diseases.

One of the fastest growing industries in the United States is the combined herbicide and spraying equipment business. Farmers alone spent an estimated \$50,000,000 last year to control weeds. Although spraying is widely practiced and accepted, it must be done with care.

Spraying is faster, easier and can be cheaper than hand-pulling weeds. But sprays must be used with caution or they might kill flowers or valuable crops at the same time they are killing unwanted weeds and grasses.

Rules for Use

Here are a few do's and don'ts in the use of sprays:

1. Do not spray when it is windy. Sprays drift.
2. Watch the weather. A chemical that is otherwise safe may damage wanted plants when the temperature is above 90 degrees Fahrenheit.
3. Use low pressure when spraying. High pressure is not needed to kill weeds.
4. Consult your local agricultural authorities to learn about differences in soils and

the way weeds grow in different parts of the country.

5. READ LABEL CAREFULLY AND FOLLOW DIRECTIONS. If used properly, herbicides are not dangerous.

Spraying can be done best during either the spring or the fall. Much of the chemical's effectiveness depends on the weather.

Three Methods of Fighting

There are three prescribed methods for fighting the weed war. They are known as pre-planting, pre-emergence and post-emergence. Pre-planting treatment is made on the soil before any seed is planted in the ground. Pre-emergence control is done after seeds have been sown, but before a desired plant pushes up through the ground. Post-emergence is designed to kill undesirable plants that exist in areas where plants are already growing.

Weeds can be best controlled either in the spring or the fall. For the control of broad-leaved weeds on home lawns this fall a mixture containing one ounce or two tablespoons of an amine salt of 2,4-D (2,4-dichlorophenoxyacetic acid) and four ounces or eight tablespoons of an ammonium salt of DNBP (4,6-dinitro ortho secondary butyl phenol) in one gallon of water per 1,000 square feet will give good control of chickweed, dandelions, curled dock, wild onion, wild garlic and henbit. KOCN can be



SPRAYING AWAY TROUBLE—A growth-inhibiting chemical, maleic hydrazide, is used here on a golf course to control the growth of grass on a hard-to-get-at bunker edge. Mixed together with 2,4-D, a herbicide, these two chemicals cut grass growth and kill weeds.

used as a substitute for DNB. MCP (2-methyl, 4-chlorophenoxyacetic acid) may be substituted for 2,4-D. Fall applications of 2,4-D are more effective than spring.

Children and animals should be kept off lawns sprayed with PMA or DNB until the first rain after application.

Crabgrass presents a rather special problem. In areas where other broadleaved weeds are killed in the spring, crabgrass often comes up before the turf grasses. Two of the most popular chemicals for fighting crabgrass that have been reported are PMA (phenyl mercuric acetate) and potassium cyanate.

Spot Control Possible

When some weeds, notably the weedy lawn grasses such as orchard grass, timothy, quackgrass, goose grass and nimble will, occur in spot infestations on the lawn, an application of TCA (trichloroacetic acid) will kill them. The solution for spot killing is prepared by dissolving one-half pound of TCA in one gallon of water. Using a syringe or spot-sprayer, wet the crowns of the weedy grass plants. This solution can kill good grass too, so care must be taken in applying it.

Spot control of broadleaved weeds can be made too. To get rid of wild onion or wild garlic, use a five percent solution of 2,4-D in water, five ounces in one gallon. Place a rubber glove over your hand and then a cotton glove over the rubber one. Dip the gloved hand into the solution, then squeeze the tops of the weeds with it hard enough to break through the leaves' waxy coating.

To effect the same control for dandelions, plantain and curled dock, use the same solution, but apply it with a piece of sponge attached to a broom handle or stick.

Treat Before Emergence

Pre-emergence control can be made in hothouses or park flower beds with SES (sodium 2,4-dichlorophenoxyethyl sulfate). This chemical does not kill growing weeds and has not been tested on all ornamentals, and therefore should be tried on a small area first. For weeds that sprout under high-branching shrubs, there are three compounds recommended, NIX (sodium isopropylxanthate), PCP (pentachlorophenol) and sodium arsenite.

On parking lots, tennis courts, patios and walks, some chemicals known as soil sterilizers will rid the area of all plant life as long as the chemicals remain potent in the soil. Caution should be used with them, as they can even kill roots of large trees in the area. Some are the arsenicals, boron compounds, combinations of sodium borate and sodium chlorate and CMU (3-p-chlorophenyl-1, 1-dimethyl urea).

In 1954, it was estimated that 85,000,000 pounds of herbicides were used for both farm and non-farm use. Much of it was used by various states to control weeds along the nation's highways. For instance, Ohio is reported to have plans for spraying 8,400 miles of highway this year.

Brush and broadleaved weeds along the highway can be fought with a combination of 2,4-D and 2,4,5-T. Some tall woody brush may require cutting and spraying. Spraying with the weed-killers mixed with oil also helps.

Poison ivy, one of the weeds most harmful directly to humans, may be killed by combining 2,4-D and 2,4,5-T, although several treatments may be required. AMMATE (ammonium sulfamate) is also a good poison ivy killer.

Weed killing specialists at the Beltsville station said that there are several groups of chemicals now being studied that show promise. Three such groups are the chlorinated propionic acids, substituted urea herbicides and the chlorinated benzoic acids.

The chlorinated propionic acids look promising for controlling weedy grasses. One closely related compound, TCA, has an advantage over older compounds—when applied to the leaves of such weeds as Johnson grass or quackgrass, it goes to the roots more readily.

Tested on Cotton Acreage

The substituted urea herbicides are designed for pre-emergence and soil sterilization. They are receiving extensive testing in the South on cotton plantations, where they are applied to the top layer of soil at the time of planting. They have also shown promise in controlling poison ivy in shaded areas, long a weed problem.

The chlorinated benzoic acids look as if they have a future as pre-emergence treatments against broadleaved weeds, especially for corn farming.

New chemical weed-killers are being developed every day and some have been found where one would least expect to find them. Two recent chemicals that show herbicidal promise are INH, isonicotinic acid hydrazide, used in the past as an anti-tubercular drug, and aminotriazole, a little known chemical used in the photographer's darkroom.

Another attack being launched against weeds is the use of "Peter Pan" chemicals that inhibit growth. One such compound recently announced is MH-40, a growth regulator that controls growth of grass at hard-to-get-at bunker edges.

The fight against weeds is a big and expensive one. Farmers last year spent almost one-fifth of their total expenditures for fighting crop pests on weed spraying and equipment. But although the problem looms large each spring, summer and fall, the battle is being won.

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The African crested porcupine is the largest living porcupine, measuring over three feet in length and weighing between 40 and 60 pounds.

There is no cure for cerebral palsy, but adequate training can make one-third of its victims entirely self-supporting, while nearly another fifth can become partially self-supporting.

METEOROLOGY

Change Ideas About Birth of Tornadoes

► **ATMOSPHERIC CONDITIONS** where tornadoes are spawned differ from those in the immediately surrounding area.

This suggestion, changing previous ideas about tornado birth, was made at the American Meteorological Society meeting in Kansas City, Mo., by Dr. Robert G. Beebe of the Weather Bureau's Severe Local Storms Forecast Center in Kansas City.

He found that the usual overall conditions of a layer of warm moist air overlaid by cool dry air do not exist in the immediate vicinity of a twister, although such conditions, known as inversions, are "well marked" six to 12 hours before the tornadoes are born.

Disappearance of inversions occurs over a period of several hours, not suddenly, Dr. Beebe found. He studied data from 22 tornadoes taken by radio-sound balloons released within 50 miles and not later than an hour after the storms started whirling.

Instead of being pinned down by the cool dry air, the warm moist air above the twister penetrates to much greater heights than previously thought, his studies showed.

Science News Letter, July 2, 1955

Have You Ever Played Nim With A Computer? GENIAC,

the first electrical brain construction kit, not only plays NIM but you can build over twenty-five other semi-automatic computers which display intelligent behavior, run on only one flashlight battery and require no soldering. GENIACs are simple enough for intelligent boys and girls to put together yet interesting to anyone because they demonstrate in easily constructed models a fascinating variety of computing and reasoning circuits. GENIAC is the result of five years of development by prominent computer designers to bring experimental reasoning machinery within the budget of the amateur scientist. Some of the 33 GENIACs you can build from the completely detailed instruction manual are:

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ASTM STANDARDS IN BUILDING CODES: Specifications, Methods of Testing, Definitions—American Society for Testing Materials, 973 p., illus., paper, \$6.00. Bringing together material formerly scattered throughout the 10,000 pages of ASTM standards.

ACCEPTANCE INSPECTION FOR THE CONSUMER—Jules Labarthe—Mellon Institute, 5 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Describing the work of the quality control laboratory.

APPROXIMATIONS FOR DIGITAL COMPUTERS—Cecil Hastings Jr., assisted by Jeanne T. Hayward and James P. Wong Jr.—Princeton University Press, 201 p., illus., \$4.00. First publication in book form of material formerly available only in limited numbers in loose sheets.

BIBLIOGRAPHY ON SOUTHWESTERN ASIA: II: A Second Compilation—Henry Field—University of Miami Press, 126 p., paper, \$3.00. Included are articles and books published from January 1, 1953, to December 31, 1954, with some earlier titles especially in medicine, geology and paleontology.

CREDIT COURSES BY TELEVISION: Report of a Conference Sponsored jointly by the Committee on Television of the American Council on Education, and Continuing Education Service, Michigan State College, East Lansing, Mich. February 21-22, 1955—American Council on Education, 49 p., paper, \$1.00.

CULTURE AND HUMAN FERTILITY: A Study of the Relation of Cultural Conditions to Fertility in Non-Industrial and Transitional Societies—Frank Lorimer with special contributions by Meyer Fortes and others and a foreword by Frank W. Notestein—UNESCO (Columbia University Press), 510 p., illus., paper, \$4.50. The disadvantage of too many mouths to feed was obvious even to primitive peoples. At the same time it was clear that a high birthrate is needed to balance high mortality.

ESSENTIALS OF BIOLOGICAL AND MEDICAL PHYSICS—Ralph W. Stacy and others—McGraw-Hill, 586 p., illus., \$8.50. Based on four years of teaching biophysics at Ohio State University.

FM LIMITERS AND DETECTORS—Alexander Schure, Ed.—Rider, 48 p., illus., paper, 90 cents. Greatest difference between FM and AM receivers is in their detector circuits. Included with an analysis of this difference is a discussion of limiters and a chapter devoted to the gated-beam detector.

FAMILY, SOCIALIZATION AND INTERACTION PROCESS—Talcott Parsons and Robert F. Bales with collaboration of James Olds and others—Free Press, 422 p., \$6.00. The authors view the American family as undergoing change but not disorganization.

THE GENUS NICOTIANA: Origins, Relationships and Evolution of Its Species in the Light of Their Distribution, Morphology and Cytogenetics—Thomas Harper Goodspeed—Chronica Botanica, 536 p., illus., \$12.50. Results of a 30-year study of this plant, including 60 species of which all but four have been grown under controlled conditions.

HANDBOOK OF 630-TYPE TV RECEIVERS—Simon S. Miller and Howard Bierman—Rider, 200 p., illus., paper, \$3.50.

HOOVER DAM QUADRANGLE NEVADA—ARIZONA: 15 Minute Series (Topographic)—Geological Survey, Wall chart, 20 cents. Map showing some of the landmarks in the area near Lake Mead.

INTERPRETATION OF REACTIONS IN ACID THIOSULFATE MEDIA—William W. Leathen and S. A. Braley—Mellon Institute, 1 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

AN INTRODUCTION TO CHEMISTRY—Howard L. Ritter—Wiley, 649 p., illus., \$6.50. Presenting chemistry as a cultural study without neglecting practical chemical information.

MATERIALS FOR NUCLEAR POWER REACTORS—Henry H. Hausner and Stanley B. Roboff with foreword by T. Keith Glennan—Reinhold, 224 p., illus., \$3.50. A guide for scientists and materials engineers as well as for investors and students.

MODERN PHYSICS—John C. Slater—McGraw-Hill, 322 p., illus., \$5.50. A text for advanced undergraduate students of science and engineering, stressing not mathematics but the history of development of ideas tied together with enough theory to make it comprehensible.

MOSQUITOES: How to Control Them on Your Property—Govt. Printing Office. USDA Leaflet No. 386, 8 p., illus., paper, 5 cents. Recommendations for preventing and eliminating this common pest.

PROPOSED PROGRAM IN ERGONOMICS—HUMAN ENGINEERING—Theodore F. Hatch—Mellon Institute, 2 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. Ergonomics, it is explained, is the basic area of applied science concerned with human behavior in response to external stress.

QUANTUM THEORY OF SOLIDS—R. E. Peierls—Oxford University Press, 229 p., illus., \$4.80. Addressed to theoretical physicists.

RIDER'S SPECIALIZED AUTO RADIO MANUAL: 6-A, Installation & Service of Custom-Built Motorola Auto Radios for All Makes of Cars—Staff—Rider, 212 p., illus., paper, \$3.00.

SOUTHERN AFRICA: A Geographical Study: Volume II, Economic and Human Geography—John H. Wellington—Cambridge University Press, 283 p., illus., \$6.50. A faculty member at the University of the Witwatersrand sheds new light on the "Dark Continent."

SYMPOSIUM ON METHODS OF TESTING BUILDING CONSTRUCTIONS—W. T. Savage, Chairman—American Society for Testing Materials, 132 p., illus., paper, \$2.75. How construction may be improved.

TREES AND SHRUBS OF THE UPPER MIDWEST—Carl Otto Rosendahl—University of Minnesota Press, 411 p., illus., \$6.00. A successor with broader scope to a definitive source book by Prof. Rosendahl and Prof. F. K. Butters, the "Trees and Shrubs of Minnesota."

Science News Letter, July 2, 1955

AGRICULTURE

Strawberries Free of Virus More Plentiful

► GARDENERS AND commercial growers in the eastern states had 24 varieties of virus-free strawberry plants available for planting this year.

Plant nurseries reported that they had about 150,000,000 disease-free plants ready for market. The first virus-free strawberries were introduced just last year.

"Most strawberries grown in the United States at present," stated the U. S. Department of Agriculture, "are affected by viruses. Although symptoms of virus infection are very hard to detect, the disease is known to hold down strawberry yields, restrict the size of fruit, and inhibit plant growth."

In addition to the eight varieties of virus-free plants made available to growers in 1954, nurserymen now have 16 more stocks that are substantially virus-free. No strawberry varieties known are immune to viruses and nurserymen must take care to keep their plants from contracting the disease.

Strawberry viruses are spread by aphids. These little insects are much more abundant in the West than the East, and have made a similar virus-free strawberry program much more difficult in that area. Some varieties are now available to western growers, however, but in limited quantity and variety.

Science News Letter, July 2, 1955

WILDLIFE

Hunters Not Expected To Get Wild Fowl Limit

► HERE IS the official answer to an old problem that has stumped duck hunters:

So long as more than the legal limit is not taken, why not bait favorite hunting grounds to bring the birds into shooting range?

The answer is simple. Hunters are not supposed to get their bag limit.

John L. Farley, director of the U. S. Fish and Wildlife Service, explained that the game limit is merely one tool of wildlife management, designed to work along with anti-baiting and other limiting regulations to protect waterfowl. If all hunters took home their legal limit, Mr. Farley said, pretty soon the United States would be scraping the bottom of the barrel for ducks and geese.

Under present waterfowl management practices, however, there is no danger of extinction of common species of ducks and geese due to hunting pressure, he said.

Science News Letter, July 2, 1955

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OCEANOGRAPHY

The Past Under the Sea

► **SCIENTISTS DRESSED** as frog-men are learning about California's archaeological past from the bottom of the Pacific.

Using self-contained underwater breathing apparatus, such as an aqua-lung, they have recovered Indian stone mortars, pestles, metates and net weights at points all along the coast. Some artifacts have been found in water 65 feet or deeper and one-half mile off shore.

How did the relics get there? No one knows for certain, but it is thought that sea level has changed enough through the years to cover what used to be beach and low cliff dwelling sites.

This is only one of the many uses scientists are finding for the free-diving apparatus, Andreas B. Rechnitzer of the Scripps Institution of Oceanography told the American Association for the Advancement of Science's Pacific Division at its meeting in Pasadena, Calif.

Free-diving has given marine biologists a revolutionary method of specimen collecting, Mr. Rechnitzer said. The old methods, such as trawls, seines, dredges and traps are limited by chance and underwater obstacles. With the free-diving gear, biologists can catch their specimens on the spot with underwater "butterfly nets," sampling bottles, spears and special poisons.

Now that the scientists can go where the fish are, many species once thought rare have become "common," and several new species have been discovered.

Scripps Institution scientists spent thousands of hours underwater on a thorough investigation of giant kelp beds along the California coast. These divers were able to study the plants and animals associated with the seaweed beds under natural conditions in their native habitat, hardly imaginable before the time of the self-contained breathing gear.

Every winter, large storm waves wash away great areas of beach. But in the summer period, the small waves bring the sand back, to complete an annual cycle. Free-divers have swum to the bottom to drive in series of graduated stakes to measure the changes in sand depth through the yearly cycle. They dive periodically now to take readings from the stakes.

These are indications of how marine scientists are using their new-found freedom with the self-contained underwater breathing apparatus. Supplemented with instrument measurements, this type of first-hand underwater observation can provide major contributions to science, Mr. Rechnitzer predicted.

Science News Letter, July 2, 1955

GENERAL SCIENCE

Science Youth Movement

► **BY AROUSING** the interest and ability of students still in high school, America can recapture from Soviet Russia leadership in production of scientific and technological manpower, Watson Davis, director of SCIENCE SERVICE, told the American Society for Engineering Education meeting in University Park, Pa.

Greater numbers of engineers and technicians are reported being produced by the forced educational system of Russia than by America's democratic system of college education, Mr. Davis warned.

"Without resorting to the methods that we are confident will eventually ruin the fruitfulness of Soviet technology," Mr. Davis said, "America must increase the flow of its talented youth into the fields of mathematics, physical and other sciences and engineering so necessary to our future."

"Experience has shown that the place to begin is as early in the high school as interest can be captured and implemented. The science club and the science fair are prime devices for doing this."

Youth must have experience in science and technology, Mr. Davis advised. By doing projects or experiments of their own that can be shown to their fellow students, parents and friends, and then exhibited in science fairs, young people acquire the in-

centive to explore and understand science and technology.

There are 15,000 science clubs in Science Clubs of America and that means students in most of the high schools can have science as a hobby, Mr. Davis explained. In about a hundred localities there are area science fairs that display each spring hundreds of science exhibits. Some 50,000 exhibits and projects are made each year.

The Seventh National Science Fair conducted by SCIENCE SERVICE, to be held in Oklahoma City, Okla., May 10-12, 1956, will be composed of about 190 winning exhibits from science fairs in all parts of the nation.

Science News Letter, July 2, 1955

FORESTRY

U. S. Tree Planting Reaches All-Time High

► **MORE TREES**, approximately 811,000 of them, were planted in the United States between July 1, 1953, and June 30, 1954, than at any previous time in the nation's history.

Announcement of the all-time high record was made by the U.S. Department of Agriculture in observance of Arbor Day.

A total of 811,066 acres was planted

during fiscal year 1954, representing a 13% increase over the last record year, 1953. Of the total planted, 687,338 acres were in private ownership, 73,017 were owned by the federal government and 50,711 by the states and non-federal public agencies.

The greatest proportion of forest and shelterbelt tree planting during the year was devoted to slash pine in the South. Both Georgia and Florida broke the tree planting record in 1954, sowing over 100,000 acres each.

Other states with large plantings were Louisiana, Mississippi, Pennsylvania, South Carolina, Michigan, New York and Alabama.

Arbor Day, which is celebrated throughout the United States and its territories from January to December, was started by J. Sterling North in Nebraska on April 10, 1872. It has now become a movement for stimulating individuals and groups to plant groves of trees as well as single trees.

Science News Letter, July 2, 1955

MEDICINE

Artificial Pacemaker Saves Dying Patients

► **AN ARTIFICIAL** pacemaker has rescued 20 of 25 desperately ill or dying persons by starting their hearts to beating again, Drs. Paul M. Zoll, Arthur J. Linenthal, Leona R. Norman, Milton H. Paul and William Gibson, of Beth Israel Hospital and Harvard Medical School, Boston, reported at the meeting of the American Medical Association in Atlantic City, N. J.

The artificial pacemaker is a 13-pound portable apparatus that stimulates the heart by an electric current across the chest.

The patients treated suffered heart standstill from attacks of Stokes-Adams disease. In these attacks changes or interruptions in the heart beat stop circulation to the brain. Dizziness, prolonged unconsciousness, convulsions and death may result from such attacks, which sometimes seem like attacks of epilepsy.

Science News Letter, July 2, 1955

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POPULATION

Influencing Family Size

► WHEN PARENTS make the decision of whether or not to have another baby, they are chiefly influenced by comments such as "Why don't you have another little boy?" or "For goodness sake, don't have any more children, you have enough work."

When grandma, the neighbors, the minister or the family doctor make comments like these, they form the strongest pressure on the couple to limit or add to the family.

Few couples give any thought to the interests of society at large. One of the best ways to insure that more babies arrive in homes of healthy and happy children is to see that neighbors are more discriminating in tossing off such opinions, Dr. Frederick Osborn, secretary of the American Eugenics Society, pointed out in *Eugenics Quarterly* (June).

Such opinions should be based, he said, on how well the couple are bringing up the child or children they already have and whether they are prepared to offer another child constant and affectionate care.

Too often, instead, they are based on generalities such as "small families are better" or "people ought to have large families."

Much stress has been laid on slum housing as a cause of juvenile delinquency, Dr. Osborn said. Bad housing also encourages irresponsible breeding of children who are

not going to get the proper home care.

Good housing should make possible larger families among responsible parents. In developing housing projects, thought should be given to providing space adequate for a certain proportion of large families at a cost that would not unduly penalize the parents for having more than three or four children.

The offering of scholarships may help or hinder more intelligent and thoughtful parents to have more children, depending on the level at which they are available. Undergraduate college scholarships encourage more children for parents who want college education for their children.

Post-graduate scholarships have the reverse effect. They encourage students to postpone marriage to an age when they are not likely to have large families.

When people take some pains to limit the number of their children, those with lowest incomes have the fewest children and the number of children increases with the family income, some evidence indicates.

There is also evidence that the more responsible parents who give their children a better home environment and are more respected in the community are the ones who tend to have the larger families.

Science News Letter, July 2, 1955

ORNITHOLOGY

NATURE RAMBLINGS



Woodpeckers

► "RRRRRRRRRRRR-RAP-RAP-RAP!"

Followed by a couple of exultant yells in bird-language.

If that kind of music wakes you up at ungodly hours, making you entertain illegal wishes for a shotgun or some other lethal instrument, you should feel complimented instead of annoyed. It means that some woodpecker has tried the end of your ridge-pole and likes the sound of your roof.

Woodpeckers are connoisseurs in drums. They seem to enjoy hammering at hollow trees, even when they have filled themselves with worms. This gratuitous drumming has been interpreted as a courtship activity—a serenade to the woodpecker's lady-love—but it goes on even after the nesting season is over. So if the courtship explanation is good at all, it is only partially good.

It looks more as though this hammering were something the woodpecker does just because he likes to do it—useful part of the time, the rest of the time merely for fun.

The woodpecker is about the only familiar bird that employs a musical instrument. Other birds are more musical, but they are vocal artists. The woodpecker is a virtuoso on the drum—a Paderewski of percussion.

Woodpeckers are about as fine examples as can be found anywhere of close adaptation of an animal to a particular mode of life. In head and beak, in tail and claws, they are especially fitted to their job as hewers of wood. Their neck muscles are much more powerful than those of other birds of their own size, and their beaks are stout, long and sharp.

Their tail-feathers have stronger shafts than those of other birds, and each ends in a sharp, thorny point instead of a little plume-like fan, as is orthodox among tail-feathers. And each foot has two toes pointing backward and two forward, making an extra strong gripping pair of double tongs, for holding to the bark while the bird plies its tools.

BIOCHEMISTRY

Removing Antibodies

► VERY SMALL glass beads can be used to get disease-fighting antibodies from blood, Dr. G. Bonar Sutherland of California Institute of Technology, Pasadena, announced at the meeting of the American Association for the Advancement of Science's Pacific Division.

The method depends on a fact familiar to many housewives. That is that when protein, such as egg white, is poured from a glass, a thin layer remains on the surface and cannot be removed by ordinary washing.

The material adsorbed to the glass consists of a single layer of protein molecules. The same situation holds for other proteins, including blood serum and the antigen used to vaccinate against disease.

To get antibody protein, or gamma globulin, from blood, Dr. Sutherland coated very small glass beads with a layer of vaccine antigen used to immunize animals. These beads were then added to blood serum from the vaccinated animals.

The vaccine antigen on the beads combined with the antibody and effectively removed it from the blood serum. When the beads were washed and resuspended in a dilute acid solution, the antibody dissociated from the antigen-coated beads and the beads were then removed, leaving the antibody in solution.

The method can be used to get pure preparations of antibody for study. Dr. Sutherland hopes it will also be a tool for isolation of antibodies which are not detectable or obtainable by ordinary methods.

"Some of these antibodies," he pointed out, "are very important as agents of diseases such as allergies and Rh blood type reactions and other diseases of obscure origin."

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Science News Letter, July 2, 1955

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STATISTICS

Release Smoking Statistics

► ABOUT HALF the men and one-fourth of the women in the United States smoke cigarettes daily. But one and one-half million have quit smoking entirely in the last year and a half.

These figures are estimates based on a representative sample of about 40,000 persons surveyed by the U. S. Bureau of the Census for the National Cancer Institute of the Public Health Service, Department of Health, Education, and Welfare.

Most of those who gave up cigarettes during the last year and a half were under age 45.

"It should be remembered," the Government statisticians pointed out, "that some of those who quit smoking recently may start again at some future date."

Further information about the smoking habits of Americans was given by the Government statisticians as follows:

The 38,000,000 cigarette smokers include 25,000,000 men and 13,000,000 women.

About 4,000,000 of the men who are cigarette smokers consume less than half a pack a day. One-half million smoke more

than two packs a day. The majority smoke 10 to 20 cigarettes a day. Two million others smoke cigarettes occasionally.

Two out of every three men 25 to 64 years old in the total population smoke regularly in one form or another.

Non-farm men are heavier smokers than those who live on farms and white men smoke more than non-whites. In the South, for example, about one-fourth of the white men who are cigarette smokers use over one pack a day, whereas only about one-eighth of the non-whites smoke this much.

Two and a half million men smoke one or more cigars daily; 7,500,000 smoke them occasionally.

Three and a half million men smoke a pipe regularly; 4,500,000 occasionally.

The findings indicate that there are larger percentages of smokers among men of the 25 to 64 group than among those below or above those ages. Greater diversity in smoking practices among women was disclosed, ranging from 35% of the 25 to 34 group, to only four percent of those 65 and over.

Science News Letter, July 2, 1955

BIOCHEMISTRY

Plants Use Molybdenum

► MOLYBDENUM, THE metallic element used in modern lubricants, does a kind of lubricating job for green plants, it appears from studies reported at a symposium on micronutrients held at Johns Hopkins University, Baltimore.

The green plant lubricating job done by molybdenum is lubricating in the sense that the metal helps along the mechanism by which plants use nitrate as a source of nitrogen for their nourishment and growth.

The studies reported to the symposium showed that molybdenum plays a key role in this chemical process by serving as an electron donor. The tests were made by Dr. Alvin Nason of the McCollum-Pratt Institute, Baltimore, and Dr. H. J. Evans of North Carolina State College in Raleigh.

In the metabolism of plants using nitrate as a nitrogen source, the compound must be first taken up by the cells and then ultimately reduced to ammonia. When a plant is supplied with isotopically labeled nitrate, Dr. Nason reported, the "tagged" element rapidly spreads throughout the tissues and is incorporated into all the major nitrogen fractions.

Some system in the plant, this shows, has reduced the nitrate nitrogen to a nitrogen form which the plant can utilize.

The enzyme system that can reduce the nitrate to the necessary reduction level of nitrite has recently been isolated from the tissues of higher plants as well as microorganisms. It is called nitrate reductase.

Dr. Nason and Evans have isolated a

highly purified nitrate reductase from soybean leaves. This enzyme system requires, in addition to the protein nitrate reductase, reduced coenzyme I (a niacin derivative) as a hydrogen donor, as well as a riboflavin derivative and molybdenum.

It has been shown in this system that electrons are transported from the reduced coenzyme I to the flavin and eventually to molybdenum, which can now in turn reduce the nitrate to the nitrite.

Science News Letter, July 2, 1955

HISTORY

Explorer's Gift Coats Cleaned After 176 Years

► FEATHER CLOAKS made from rare and extinct birds, presented to Captain James Cook before he was killed in Hawaii in 1779, have been overhauled, cleaned and exhibited at the Dominion Museum, Wellington, New Zealand.

Cleaning with a mixture of detergent and water brought out for the first time the brilliant reds and yellows of the cloaks. The 20,000 feathers are individually attached to the cloak's backing.

Native hunters collected the feathers to adorn the cloaks, one of which is said to have taken a century to make. Only high-ranking noble women and tribal princesses were entrusted with sewing the rare cloaks.

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Questions

BIOCHEMISTRY—How does a slow thyroid gland affect a child's reading ability? p. 8.

□ □ □

ENGINEERING—Why do auto engines need high octane fuel? p. 9.

□ □ □

HORTICULTURE—When are the best times to control weeds? p. 10.

□ □ □

NEUROLOGY—What is the effect of drugs on artists' work? p. 4.

□ □ □

OCEANOGRAPHY—How is free diving gear helping oceanographic studies? p. 13.

□ □ □

PHYSICS—What are the highest man-made energies yet attained in an accelerator? p. 6.

□ □ □

TECHNOLOGY—What principle may revive the windmill? p. 8.

□ □ □

Photographs: Cover, Clifford E. Matteson; p. 3, U. S. Navy; p. 5, Westinghouse Electric Corporation; p. 7, General Electric Company; p. 10, United States Rubber Company; p. 16, Bakelite Company.

DERMATOLOGY

Hydrocortisone Prevents Sunburn by Screening

► HYDROCORTISONE, CLOSE relative of anti-arthritis cortisone, will prevent sunburn. It does this by filtering or screening out the light rays that do the sunburning.

Anti-sunburn preparations are not likely to contain it, however, because it is not as efficient in this respect as the much cheaper tannic acid.

Studies with human volunteers showing the effects of hydrocortisone and tannic acid in screening the skin from sunburning rays were reported by Dr. Norman B. Kanof of New York University Post-Graduate Medical School and University Hospital, New York, at the meeting of the Society for Investigative Dermatology in Atlantic City, N. J.

Hydrocortisone failed as a remedy for either sunburn or heat burns when applied after the burn.

Science News Letter, July 2, 1955

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⚙️ **TIMING LIGHT**, shaped like a pistol, is housed in an unbreakable neoprene case. Designed for use on all automotive engines, this 10¼-inch tester will operate on battery or magneto ignition systems, or wherever there is a high tension spark and 110 a.c. The device can also be used to time engines on farm tractors, lawn mowers, etc.

Science News Letter, July 2, 1955

⚙️ **WINDOW BALANCER** and tightener does away with the job of replacing broken sash cords. Fully adjustable after installation, the device can balance any weight window or be adjusted for swelling or warping of the sash. Plated against rust, the balancer is made to be installed by the homemaker.

Science News Letter, July 2, 1955

⚙️ **PAINT BRUSHES** are designed to be thrown away after use, thus eliminating troublesome and dangerous cleaning in inflammable fluids. A package contains five inexpensive brushes in widths of a half inch to two inches. The brushes are bristle, vulcanized in rubber and gripped in wooden handles.

Science News Letter, July 2, 1955

⚙️ **FOUR-PIECE LUNCH** kit is made up of individual, sealed containers molded of



polyethylene and holds a variety of foods. The portable lunch kit, shown in the photograph, includes a sandwich box, pie container, portion dish and small jar. After carrying the food without fear of spilling or crushing, a diner can eat right out of the containers.

Science News Letter, July 2, 1955

⚙️ **SAFETY GATE** keeps lads and lassies in a room without closing the door on them. Placed across the threshold and clamped tight, the 25-in-high gate fits any door frame. The portable hardwood gate telescopes into place.

Science News Letter, July 2, 1955

⚙️ **PLASTIC PIPE**, geared to take the place of steel pipe in corrosive service installations, is made of a thermosetting resin reinforced with thousands of continuous fibers. The lightweight pipe can be installed without the use of heavy equipment and can be cemented or screwed together.

Science News Letter, July 2, 1955

⚙️ **INDUSTRIAL GLOVES** for safer, surer handling of chemicals are made of flock-lined neoprene. Thousands of tiny cotton particles are bonded to the inside of the rubberized outer glove. The outside of the glove also has a molded non-slip grip on the fingers and palm.

Science News Letter, July 2, 1955

⚙️ **HOSE ATTACHMENT** mixes all water-diluted liquids for spraying accurately with water pressure of 20 pounds or more. The translucent, plastic bottle is marked for ounce measurement or degree of fill, holding enough insecticide to make from 32 to 150 gallons of solution. Adjustable to each application, the garden hose attachment has a brass jet metering stem for simple dilution adjustment.

Science News Letter, July 2, 1955

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Do You Know?

A new substance to combat deadly penicillin-resistant bacteria has been extracted from beef brain tissue.

About 83% of all vacation trips in the United States are made by automobile, with an average round trip mileage of 978 miles.

The moment when liver cancer strikes has been determined in rats through changes in the chemistry of the living cells.

In an automobile accident in which someone is injured, chances of a death at 40 miles an hour are 1 in 16; at 55 miles an hour 1 in 12; at 65 miles an hour the chances are 1 in 6.

Four of the largest hangars in Great Britain, at London Airport, have been fitted with photocell units that automatically control the lighting, switching it off when daylight makes electric lights wasteful.